# Scientists show a decline in solar activity could not halt global warming

**23 June 2015 - Return of 'grand solar minimum' could affect European and eastern US winters - but wouldn't halt global warming**

A return to low solar activity not seen for centuries could increase the chances of cold winters in Europe and eastern parts of the United States but wouldn't halt global warming, according to new research.

The Met Office-led study, published in Nature Communications , is among the first to look at the regional climate impacts of a possible 'grand solar minimum'.

It's understood the sun's output increases and decreases, measured by the number of sunspots on the star's surface, over a timescale of 100 - 200 years.

Some solar physicists believe there's an increased risk that we're heading towards the lower end of this cycle - last seen during the so-called 'Maunder Minimum' which ended 300 years ago. This coincided with colder winters in the UK and Europe, with 'frost fairs' held numerous times on a frozen River Thames.

Climate scientists have been carrying out research to assess how important this might be for global temperatures, particularly in the context of climate change.

The new study used a climate model to simulate conditions between 2050 and 2099 under the RCP 8.5 scenario (which assumes 'high-end' future carbon concentrations), but crucially includes a solar output decreasing to Maunder Minimum levels.

Like other studies, they found the global impact from reduced solar output was relatively small - with a cooling effect of around -0.1 °C. This is much smaller than the amount of warming expected due to greenhouse gases, which is several degrees for this experiment.

On a regional level, the study found a bigger cooling effect for northern Europe, the UK and eastern parts of North America - particularly during winter. For example, for northern Europe the cooling is in the range -0.4 to -0.8 °C.

Winters will be warmer overall, but this suggests a relative increase in the risk of colder winters for these areas during a possible grand solar minimum.

Sarah Ineson, a Met Office scientist and lead author of the research, said the impact of a grand solar minimum would only temporarily moderate the future warming we expect from climate change.

"This research shows that the regional impacts of a grand solar minimum are likely to be larger than the global effect, but it's still nowhere near big enough to override the expected global warming trend due to man-made change," she said.

"This means that even if we were to see a return to levels of solar activity not seen since the Maunder Minimum, our winters would likely still be getting milder overall."

One key finding of the research at a regional level was that a drop in UV output led to a cooling which was a sizable fraction of the difference between some of the socio-economic (RCP) scenarios used by climate scientists to assess future warming.

Researchers concluded that this meant solar output is important enough to include when assessing the regional impacts of future climate change.

Amanda Maycock, a scientist at the University of Cambridge and National Centre for Atmospheric Science , said: "Given the outlook for solar activity from some experts, it's important that we consider the potential impact of changes in UV output when looking at future climate."

Sarah Ineson concludes: "This study shows that the sun isn't going to save us from global warming, but it could have impacts at a regional level that should be factored in to decisions about adapting to climate change for the decades to come."

The study was a collaboration between scientists at the Met Office and the University of Cambridge, University of Oxford and University of Reading in the UK, and the University of Colorado in the US.

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